

Right Triangles and Trigonometry

Topic/Assignment	I CAN statement	
Pythagorean Theorem	1) I can find sides of a right triangle using Pythagorean theorem	Yes No
Sine, cosine, and tangent ratios HW: Trig Worksheet	1) I can apply the sine, cosine, and tangent ratios to find missing sides lengths	Yes No
Solving Triangles HW: Solving Triangles Worksheet	1) I can apply the inverse trig functions to find missing angle measurements. 2) I can solve a triangle by finding all side lengths and all angle measurements.	Yes No

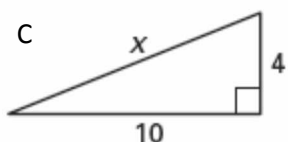
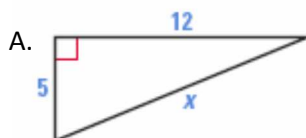
THE PYTHAGOREAN THEOREM

Objectives: 1) I can find sides of a right triangle using Pythagorean Theorem.

	to find hypotenuse (opposite the right angle)	to find one of the sides that form the right angle
Pythagorean Theorem		

a) 13; b) 12.12 c) 10.77 d) 9.54 feet

Find the length of the missing side of the triangle. *Leave answers rounded to 2 decimal places (if rounding is needed).*



PYTHAGORAS

Can only occur in a right angled triangle

right angle

hypotenuse
- is opposite the right angle and is ALWAYS the longest side.

Pythagoras Theorem states:

$$h^2 = a^2 + b^2$$

Calculating the Hypotenuse:

e.g.

square
root
undoes
squaring

$$x^2 = 3^2 + 6^2$$

$$x^2 = 45$$

$$x = \sqrt{45}$$

$$x = 6.71 \text{ m (2 d.p.)}$$

e.g.

$$x^2 = 7.65^2 + 11.3^2$$

$$x^2 = 186.2125$$

$$x = \sqrt{186.2125}$$

$$x = 13.65 \text{ mm (2 d.p.)}$$

D. You place a 10 foot ladder against a wall. If the base of the ladder is three ft. from the wall, how high up the wall does the top of the ladder reach?

Draw a sketch!

TRIGONOMETRY

Objectives: 1) I can apply the sine, cosine, and tangent ratios to find missing sides lengths

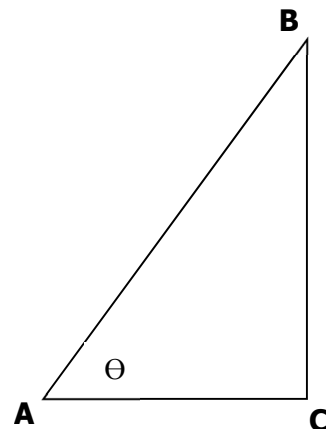
Trigonometric Ratio: the ratio of 2 sides of a right triangle.

a number

has special name(s)

helps find a missing side or angle of a right triangle

Sine	
Cosine	
Tangent	



S O H C A H T O A

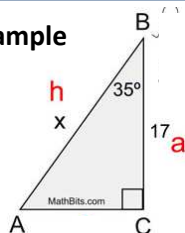
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Use trigonometric ratios to find the value of the variables. Round to the nearest hundredth.

For each,

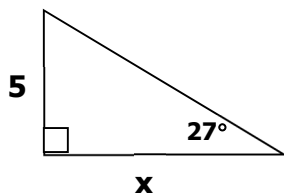
1. Label the diagram with given side and the side you want to find with **o** and/or **a** and/or **h**
2. Write the trig ratio that involves those two letters.
3. Substitute the numbers into the ratio.
4. Find **x**, rounded to 2 decimal places. a) 9.81 b) 6.88

example

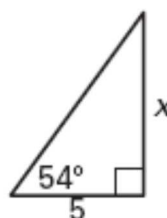


$$\begin{aligned}\cos \theta &= \frac{a}{h} \\ \cos 35 &= \frac{17}{x} \\ x \cos 35 &= 17 \\ x &= \frac{17}{\cos 35} \\ x &= \frac{17}{0.8191} \\ x &= 20.75\end{aligned}$$

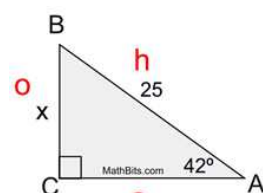
A)



B)



example



$$\sin \theta = \frac{o}{h}$$

$$\sin 42 = \frac{x}{25}$$

$$x = 25 \sin 42$$

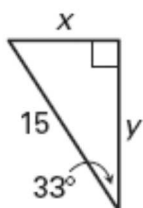
$$x = 16.72$$

(cross –multiply)
Find sin42 then multiply by 25

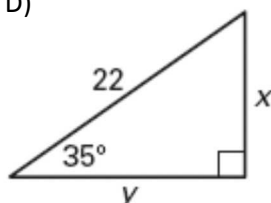
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Find x using a trig ratio. Find y using a trig ratio or using Pythagoras. c) $x = 8.17$; $y = 12.18$ d) $x = 12.61$; $y = 18.03$

C)



D)



SOLVING RIGHT TRIANGLES

- Objectives:
- 1) I can apply the inverse trig functions to find missing angle measurements.
 - 2) I can solve a triangle by finding all side lengths and all angle measurements.

*Once you know the sine, cosine, or tangent of an acute angle, you can use a calculator to find the measure of the angle.

Example if $\sin \theta = \frac{3}{2}$ then $\theta = \sin^{-1}(\frac{3}{2})$. Find the inverse sine of $(3 \div 2)$ to find θ .

FOR ANY ACUTE ANGLE A:

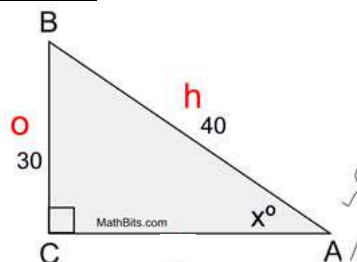
If $\sin \theta = x$, then	
If $\cos \theta = y$, then	
If $\tan \theta = z$, then	

Use trigonometric ratios to find the value of the angle, x . Round to the nearest degree.

For each,

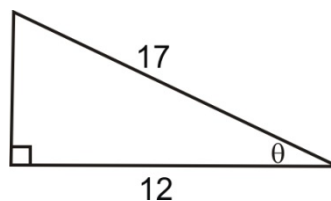
1. Label the diagram with given side and the side you want to find with o and/or a and/or h
2. Write the trig ratio that involves those two letters.
3. Substitute the numbers into the ratio.
4. Divide the two numbers and use the inverse trig function to find the angle, rounded to the nearest degree.

Example



$$\begin{aligned}\sin \theta &= \frac{o}{h} \\ \sin x &= \frac{30}{40} \\ x &= \sin^{-1}\left(\frac{30}{40}\right) \\ x &= 49^\circ\end{aligned}$$

A)



Name: _____ Date: _____ Slot: _____

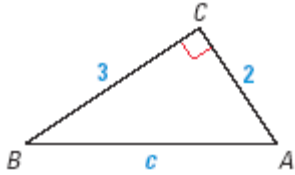
If you are finding a SIDE you use _____.

If you are finding an ANGLE you use _____.

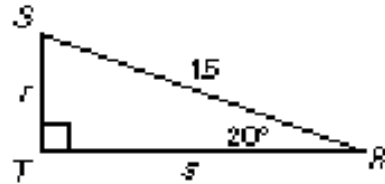
Solve the following right triangles (find all missing sides and angles).

- Round sides to the nearest hundredth, angles to nearest degree.
- If you know two sides, find third side using Pythagoras.
- If you know two angles, find third angle by subtracting two angles from 180° .

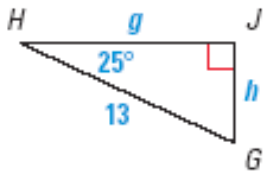
A.



B.



C.



D.

